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AUTOMATIC VENDING MACHINE FOR CUP TYPE DRINKS

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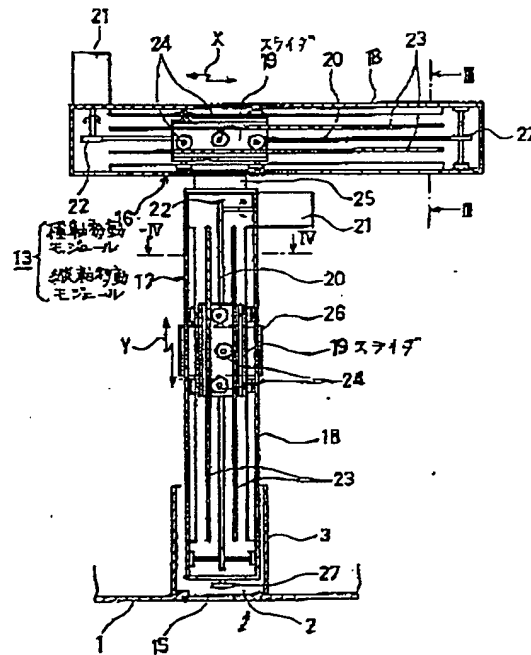
## Abstract

### Objective

To be able to smoothly transfer a cup supplied from a cup supplier and to send it to a product discharge port while raising the degree of freedom of the layout in various kinds of equipment arranged in the machine.

### Constitution

A stage movement mechanism 13 for moving a moving stage for receiving and holding a cup supplied by a cup supplier along a transfer path consists of an abscissa moving module 16 for moving a slider 19 along a fixed slide base in the horizontal direction and an ordinate moving module 17 which is positioned in front of the abscissa moving module 16 and in which the rear end of a movable slide base in the front and rear direction is connected to the slider 19 of the abscissa moving module 16. The moving stage is mounted on the slider 19 of the ordinate moving module 17.



Key:	16	Abscissa moving module
	17	Ordinate moving module
	19	Slider

## Claims

1. An automatic vending machine for cup type drinks, characterized by the fact that it is equipped with a moving stage with a cup holder for receiving and holding a cup supplied by a

cup supplier, a stage movement mechanism for moving the moving stage along a transfer path, various raw material suppliers which are arranged at subsequent stages from the above-mentioned cup supplier on the transfer path of the above-mentioned moving stage and can supply various kinds of raw materials, and a water supplier for dilution which is arranged at a subsequent stage from the above-mentioned various raw material suppliers on the transfer path of the above-mentioned moving stage and can supply water for dilution to the cup of the above-mentioned moving stage; the above-mentioned stage movement mechanism consists of an abscissa moving module for moving a slider along a fixed slide base in the horizontal direction and an ordinate moving module which is positioned in front of the abscissa moving module and in which the rear end of a movable slide base in the front and rear direction is connected to the slider of the above-mentioned abscissa moving module; and the above-mentioned moving stage is mounted on the slider of the ordinate moving module.

2. The automatic vending machine for cup type drinks of Claim 1, characterized by the fact that a stop mechanism which is selectively operated and can enter and exit is disposed at an intermediate stop position designated on the transfer path of the moving stage.

3. The automatic vending machine for cup type drinks of Claim 1 or 2, characterized by the fact that a product discharge port is equipped with a product discharge gate opened by manual operation by a customer and with a chain key mechanism which latches and restrains the moving stage, which has been transferred to the product discharge port, by interlocking with the opening operation of the production discharge gate.

4. The automatic vending machine for cup type drinks of one of Claims 1-3, characterized by the fact that the product discharge port is equipped with a stage cover installed in the machine; and a shutter mechanism, which normally closes the opening part of the moving stage approach side and opens it by the approach of the moving stage, is installed in the stage cover.

5. The automatic vending machine for cup type drinks of one of Claims 1-4, characterized by the fact that for the cup supplier and various raw material suppliers distributed in the machine in accordance with the kind of drink for sale, the moving stage is moved and controlled along the shortest transfer path to the product discharge port via a designated supply position of the cup supplier and the various raw material suppliers in accordance with the drink selection.

6. The automatic vending machine for cup type drinks of one of Claims 1-5, characterized by the fact that each of the driving motors of the abscissa moving module and the ordinate moving module is operated and controlled by switching one drive unit through a relay.

Detailed explanation of the invention

[0001]

## Industrial application field

The present invention pertains to an automatic vending machine for cup type drinks, which puts drinks prepared by adding warm water, water, ice, etc., into various kinds of powders and liquid raw materials such as coffee, cocoa, tea, or syrup and provides them for sale, especially to a constitution of its cup transfer system.

[0002]

## Prior art

In this type of conventional automatic vending machine for cup type drinks, a system that carries raw materials and warm water into a mixing bowl of the machine by a sales instruction, prepares a drink by stirring the raw materials, and charges the drink through a drink hose from the mixing bowl into a cup transferred to a vending stage.

[0003]

In such a conventional automatic vending machine for cup type drinks, since dregs are attached to the inside of the mixing bowl and its subsequent drink hose in the drink stirring and supply process, if the sales wait time is lengthened, bacteria are generated in the dregs with the lapse of wait time and mixed into the drink in the next drink sale, so that hygienic problems are generated. Also, since drink nozzles are distributed and exposed in the vicinity of the product discharge port, mischievous acts such as contamination of the drink nozzles and putting of foreign matter into them are likely to be committed. Thus, there is also a problem in terms of safety.

[0004]

From such a viewpoint, an automatic vending machine for cup type drinks, which solves the above-mentioned problems in terms of hygiene and safety and can decrease maintenance by omitting labor for cleaning due to the problems is proposed in Japanese Patent Application No. Sho 61[1986]-12903, for instance, by the same applicant.

[0005]

Such an automatic vending machine for cup type drinks is equipped with a cup supplier, various raw material suppliers, a water supplier for dilution, a drink stirrer, and a cup transferer for circulating and transferring a cup along the path of a vending stage connected to a product discharge port distributed in the machine. The cup supplied from the cup supplier is received and

held by a sales instruction, and said cup is sent to the vending stage through the raw material suppliers, the water supplier for dilution, and the drink stirrer. At the same time, during the cup transfer, first, designated raw materials are released and supplied into the cup, and a drink is prepared by supplying warm water, water, and ice for dilution and applying a drink stirring operation. Then, the drink-containing cup is sent to the vending stage. Here, the cup transferer consists of a conveyance belt such as an endless belt tensioned along a transfer circulation path and a cup holder which is supported on the periphery of the conveyance belt and receives and holds the cup released and supplied from the cup supplier.

[0006]

Problems to be solved by the invention

There are the following problems in the proposed circulation transfer type cup supplier using the conveyance belt.

[0007]

(1) The cup held in the cup holder in the cup transfer process is subjected to rapid acceleration and rapid deceleration when it rotates on a corner part of the conveyance band along the circulation transfer path in the machine. As a result, the liquid drink stored in the cup is likely to overflow due to inertia.

(2) If the conveyance belt is moved at high speed, vibration easily results in the belt, and the drink is likely to overflow similarly to (1) due to its influence.

(3) Since the vending stage of the product discharge port is crossed by the cup transfer path, it is hard to partition the vending stage with a partition wall. As a result, the cup transferer in the machine or various kinds of equipment arranged in the machine are almost defenseless against mischief through the product discharge port and are easily subjected to mischief.

(4) In the cup transfer path from the cup supplier to the vending stage, it is necessary to arrange various raw material suppliers and the water supplier for dilution in one column. For this reason, the layout in the machine of various kinds of equipment correspondingly positioned on the transfer path of the cup transferer is subject to restrictions.

[0008]

The present invention considers these points, and its objective is to provide an automatic vending machine for cup type drinks that can smoothly transfer a cup supplied from a cup supplier and send it to a product discharge port, while raising the degree of freedom of the layout of various equipment arranged in the machine.

[0009]

Means to solve the problems

In order to achieve such an objective, the present invention is equipped with a moving stage with a cup holder for receiving and holding a cup supplied by a cup supplier, a stage movement mechanism for moving the moving stage along a transfer path, various raw material suppliers which are arranged at subsequent stages from the above-mentioned cup supplier on the transfer path of the moving stage and can supply various kinds of raw materials, and a water supplier for dilution which is arranged at a subsequent stage from the above-mentioned various raw material suppliers on the transfer path of the moving stage and can supply water for dilution to the cup of the moving stage. The stage movement mechanism consists of an abscissa moving module for moving a slider along a fixed slide base in the horizontal direction and an ordinate moving module which is positioned in front of the abscissa moving module and in which the rear end of a movable slide base in the front and rear directions is connected to the slider of the abscissa moving module, and the moving stage is mounted on the slider of the ordinate moving module.

[0010]

Operation

The moving stage is moved in the horizontal and the vertical directions by the abscissa moving module and the ordinate moving module according to a sales instruction and transferred along a designated transfer path. During the transfer, a drink is prepared in the cup held on the moving stage, and the drink-containing cup and the moving stage are transferred to the product discharge port.

[0011]

Application example

Next, an application example of the present invention will be explained based on the figures.

[0012]

Figure 1 is a basic constitutional diagram showing an automatic vending machine for cup type drinks. Figures 2-4 are constitutional diagrams showing a detailed application example of the stage movement mechanism in Figure 1. Figures 5(a) and (b) are illustrative diagrams each showing a different pattern of the cup transfer path. Figures 6-8 are constitutional diagrams showing application examples of the structure of various kinds of equipment other than the above-mentioned equipment.

[0013]

First, in Figure 1, 1 is a cabinet of the automatic vending machine, and 2 is a product discharge port opened at its front. 3 is a stage cover of a moving stage, which will be mentioned later, protruding into and fixed to the machine inside from the product discharge port 2, and in the machine, cupper supplier 5 for housing a number of cups 4, several units of raw material suppliers 6 for storing raw materials by kind, cold water tank 7 and warm water tank 8 as water suppliers for dilution, a drink stirrer 9, ice maker 10, etc., are distributed and arranged. Furthermore, a moving stage 12 with a cup holder 11 for receiving and holding cup 4 and a stage movement mechanism 13 for moving said moving stage 12 along a designated cup transfer path are installed opposed the above-mentioned various kinds of equipment under said equipment. Also, 14 is an operation control part, and the above-mentioned various kinds of equipment and the stage movement mechanism 13 are controlled based on instruction from the operation control part 14.

[0014]

With this constitution, if a sales instruction is given, first, the moving stage 12 receives and holds a cup released and supplied by the cup supplier 5 at a wait position A by instruction from the operation control part 14, and the moving stage 12 is moved in an arrow P direction via positions B, C, and D corresponding to the raw material supply end of each raw material supplier 6 by the stage movement mechanism 13 and temporarily stops at a designated position during a transfer. The raw materials are directly released and supplied into the cup 4 from the raw material suppliers 6. Then, when the moving stage 12 arrives at position E, water for dilution and ice are supplied into the cup and stirred, so that a drink is prepared. Finally, along with the drink-containing cup 4, the moving stage 12 is transferred inside the stage cover 3 opposite the product discharge port 2. Here, if a customer opens the product discharge gate 15 provided in the product discharge port 2 and draws out the drink-containing cup 4, the moving stage 12 pulls back from the product discharge port and returns to the sales wait position. Also, in the example shown in the figure, the supply of the water for dilution and ice and the drink stirring are simultaneously carried out at position E, however it is not necessary to carry out these processes at the same position. The drink stirring position can also be set at the rear stage from the water supplier for dilution. Furthermore, the drink stirrer can be arranged so that it can be moved parallel with the moving stage 12. Thus, without a temporary stop, the drink can be stirred in the moving process of the moving stage, so that the sales time can also be shortened.



[0015]

Next, the structure of a detailed application example of the moving stage 12 and the stage movement mechanism 13 will be provided. First, in the application example shown in Figures 2-4, the stage movement mechanism 13 is constituted as an X-Y rectangular coordinate type movement mechanism in which respectively linear movement type abscissa moving module 16 and ordinate moving module 17 are arranged at the front and rear. Here, each of moving stages 16 and 17 has approximately the same structure and respectively consists of slide base 18, slider 19, driving conveyance belt 20 connected to slide 19 and tensioned in the slide base 18, and driving motor 21 which can be a pulse motor, reversible motor, etc. Also, 22 is a sprocket for tensioning the conveyance belt, 23 are guide rails for the slider 19, and 24 are guide rollers of the slider 19 opposite the guide rails 23.

[0016]

Here, the abscissa moving module 16 is fixed and disposed at a rear position in the machine while setting the slide base 18 in the horizontal direction. On the other hand, the ordinate moving module 17 sets the slide base 18 in the front and rear directions, and its rear end is connected to the slide 19 built in the abscissa moving module 16. Furthermore, the moving stage 12 is mounted and supported on the upper surface of the slide base 18 in the built-in slider 19 of ordinate moving module 17 via a connecting piece 26. Also, 27 is a horizontal roller installed at the tip of the ordinate moving module 17. Meanwhile, the moving stage 12 also acts as a vending stage and is constituted as a frame with a case structure of which the upper surface and the front surface are opened, and the cup holder 11 which sandwiches the cup 4 from both the left and right sides inside the frame and receives and holds it at a fixed position is provided inside the frame. Also, the stage cover 3 installed at the product discharge port 2 opposite the moving stage 12 covers the upper surface and the left and right side surfaces in accordance with the external size of the moving stage 12. The stage cover 3 in the example shown in the figure has a structure in which the three surfaces consisting of the upper surface and the two left and right side surfaces of the moving stage 12 are covered, and the lower surface side is opened. However, if the shape of the connecting piece 26 is changed and the moving stage 12 protrudes more to the front from the tip of the ordinate moving module 17 and can be moved, the stage cover 3 can partition the four surfaces of the upper and lower surfaces and the left and right surfaces without interference with the moving module 17.

[0017]

In such a constitution, the abscissa moving module 16 and the ordinate moving module 17 can be operated in the horizontal direction and the front and rear directions so that the moving

stage 12 can be moved to an optional position on the rectangular coordinate system of arrowheads X and Y. Therefore, the arrangement of the cup supplier, various raw material suppliers, the water suppliers for dilution, drink stirrer, etc., distributed in the machine can be freely laid out without restrictions, unlike a conventional belt conveyance system. At the same time, a cup received from the cup supplier is transferred along a designated cup transfer path between the various equipment, and in the transfer process, after a drink has been prepared in the cup, the drink-containing cup 4 along with the moving stage 12 can be transferred inside the stage cover 3 opposite the product discharge port 2. Also, if there is a margin in the sales operation time, for the driving motors 21 of the above-mentioned abscissa moving module 16 and ordinate moving module 17, each moving module can also be operated and controlled in alternate fashion by switching one driving motor driver unit through a relay. Thereby, the total cost can be reduced.

[0018]

Furthermore, since the stage movement mechanism 13 is a combination of linear movement mechanisms, there are no problems such as rapid acceleration, rapid deceleration, and vibration occurring at a corner part of the cup transfer process as seen in a conventional belt circulation system, and the drink-containing cup can be smoothly transferred to the product discharge port. Also, the moving stage 12 can be transferred to the stage cover 3 of the product discharge port from the rear side, and at the sales position, since the product discharge port 2 and the machine inside are completely separated by the stage cover 3 and the moving stage 12, a hand cannot be inserted into the machine from the product discharge port, so that damage to equipment in the machine can be reliably prevented.

[0019]

On the other hand, for the above-mentioned stage moving mechanism 13, as mentioned in Figure 1, it is necessary to stop and control the moving stage 12 at each position A-F designated on the transfer path in accordance with the cup supply, raw material supply, diluting water, ice supply, and drink stirring position. Furthermore, in this case, since the kinds of cup and raw materials supplied into the cup depend on the kind of sales drink, it is also necessary to vary the intermediate stop positions in the transfer of the moving stage in accordance with the selection of the drink so a stop will occur at each designated supply position of the cup supplier and the raw material suppliers.

[0020]

Next, detailed pattern examples of a cup transfer path set in accordance with the stage movement mechanism are shown by Figures 5(a) and (b). In the figures, A1-A3 are different kinds of raw material suppliers, C1 and C2 are different kinds of cup supply positions, and M is a supply of water for dilution and ice and a drink stirring position. V is a sales position of a product discharge port. A line connecting each position shows a cup transfer path. Also, in Figures 5(a) and (b), various kinds of supply positions are distributed in an X-Y coordinate system, and a cup transfer path is selected so that the supply of a designated cup and raw materials may be received in accordance with the selection of a sales drink. Also, in this case, if the cup supplier C1 and the raw material supply position A1 corresponding to the drink with the highest sales frequency among the various kinds of sales drinks is set near the position of the product discharge port and the cup is transferred via the shortest distance from the position C1 as a start point to C1-A1-M-V, the customer wait time can be shortened by reducing the sales time, so that the service performance can be improved. Also, the difference between Figure (a) and the Figure (b) concerns the drink stirring position M and the sales position V, and they are selected in relation to the layout of various kinds of equipment in the machine. Also, the arrangement of the cup suppliers C1 and C2 and the raw material supply positions A1-A3 can be changed without being limited to the examples shown in the figures.

[0021]

The stage movement mechanism for moving the moving stage along the cup transfer path is operated and controlled by program-controlling the drive motor of the stage movement mechanism by instruction from the operation control part with temporary stopping of the moving stage at prescribed positions along the designated path. In this case, in correctly positioning and stopping the moving stage at prescribed positions while suppressing the inertial force when the moving stage is stopped, a mechanical stop mechanism for the moving stage selectively applied at a designated stop position is required in addition to high performance of a driver of the driving motor and a position detecting sensor.

[0022]

Figure 6 shows an application example of a stop mechanism that stops the moving stage at a prescribed stop position in accordance with the kind of sales drink. In the application example shown in Figure 6, the above-mentioned linear moving modules are adopted. At the cup supply position, the raw material supply positions, etc., designated on the transfer path of the moving stage 12, a stop mechanism 45 introduced and removed between an operation position and a non-operation position by a control instruction is installed opposite the slider 19 of each

moving module. The stop mechanism 45 is constituted by installing a rotary lever type stop piece 47 in a rotary solenoid 46, and the stop piece 47 is normally pulled back to the non-operation position shown by a dotted line and lies in wait. If an operational signal is given, the stop piece 47 is protruded to an activated position by the operation of the solenoid 46, and the moving stage 12 moved into a position is positioned and stopped. The stop mechanism is not limited to a rotary solenoid system but a reciprocation type solenoid may be used, and as its driving method, a pneumatic drive or a hydraulic drive can also be adopted in addition to an electric type. Also, the stop piece 47 is made of an elastic body such as rubber so that the movement inertia of the moving stage 12 may be buffered and absorbed. Also, a separate dumper mechanism can be provided to the stop piece. Also, in the figure, 48 shows stops of the moving stage 12 installed at both ends of the slide base of a moving module.

[0023]

In the above-mentioned drink sales operation, in a state in which the moving stage arrives at the sales position of the product discharge port, it has been explained that mischief can be prevented by a block between the product discharge port and the machine inside with the stage cover and the moving stage. In this case, in order to make mischief prevention more reliable, the moving stage is preferably placed in position by a restraint chain key so that the moving stage may not be moved, even by inserting a hand into the product discharge port and pressing the moving stage. Next, an application example of a moving stage chain key mechanism for such a purpose is shown in Figure 7. Figure 7 shows a sales position state in which the moving stage 12 along with the ordinate moving module 17 is transferred inside the cover 3 being moved to the product discharge port. In the figure, 49 is a chain key mechanism, and said chain key mechanism 49 consists of a chain key lever 50 opposite the rear end of the slider 19 of the moving module 17, a wire 52 pulled and tensioned through a pulley 51 between said chain key lever 50 and the product discharge gate 15 provided to the product discharge port, and a spring 53 for forcing the chain key lever 50 into a pullback position. Also, 54\* is a return spring for returning the product discharge gate 15 to a closing position.

[0024]

With such a constitution, if the moving stage 12 on which the drink-containing cup is placed arrives at the product discharge port and a customer manually opens the product discharge gate 15, the wire 52 is pulled by interlocking with the gate opening operation, and the chain key lever 50 is latched to the rear end of the slider 19. Therefore, in an open state of the gate 15, even

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\* [Figure 7 mistakenly shows 59 as the return spring.]

if the moving stage 12 is pressed from the front, the moving stage 12 will not move, so that mischief to the machine inside can be reliably prevented together with the stage cover 3. The above-mentioned chain key mechanism shows one example, and a constitution in which opening of the product discharge gate 15 is electrically detected and the chain key lever is operated by solenoid operation, for example, can also be adopted.

[0025]

Figure 7 shows a mischief prevention measure at a sales position. Figures 8(a) and (b) show application examples of the mischief prevention structure of the product discharge port in a state other than the sales position. In other words, in these application examples, a French door type shutter mechanism 55 for blocking the rear end opening part is normally mounted at the rear end of the stage cover 3 installed at the product discharge port 2. The shutter mechanism 55 consists of two sheets of gate plates 56 and 57 hinge-coupled at the rear end of the stage cover 3, a stop 58 for hindering backward opening of the door plates 56 and 57 in a closed state, and a spring 59 for normally forcing the gate plates in the closing direction.

[0026]

In such a constitution, in a state in which the moving stage 12 is not transferred inside the stage cover 3, as shown in figure (a), the shutter 55 is closed, so that a hand cannot be inserted into the machine, even if the product discharge gate 15 is opened. On the other hand, as shown in figure (b), if the moving stage 12 advances into the stage cover 3 from the rear side and arrives at the sales position, the moving stage 12 itself presses and opens the above-mentioned shutter 55. Also, when the moving stage 12 pulls back from the sales position, the shutter 55 is re-closed by force of the spring. Thus, the mischief of hand insertion into the machine from the product discharge port 2 can be reliably prevented. Also, a constitution in which a separate chain key mechanism is provided to the shutter and the chain key is released by detection only when the moving stage is to be transferred can be adopted.

[0027]

#### Effect of the invention

As mentioned above, the present invention consists of a stage movement mechanism that moves the moving stage for receiving and holding a cup supplied from the cup supplier along a transfer path, an abscissa moving module that moves a slider along a fixed slide base in the horizontal direction, and an ordinate moving module which is positioned in front of the abscissa moving module and in which the rear end of the movable slide base in the front and rear directions is connected to the slider of the above-mentioned abscissa moving module. The

above-mentioned moving stage is mounted in the slider of the above-mentioned ordinate moving module, so that a rectangular coordinate type movement mechanism can be easily constituted by the combination of the abscissa moving module and the ordinate moving module. Thereby, the restrictions of the layout arrangement of various kinds of equipment such as cup supplier, various kinds of raw material suppliers, diluting water and ice suppliers, and drink stirrer in the machine are eliminated, and with maintenance performance as a priority, the installation positions of various kinds of equipment can be set at optimum positions.

#### Brief description of the figures

Figure 1 is a basic constitutional diagram showing an application example of the present invention.

Figure 2 is a horizontal plan view showing a detailed constitution of the stage movement mechanism in Figure 1.

Figure 3 is a cross section along III-III in Figure 2.

Figure 4 is a cross section along IV-IV in Figure 2.

Figure 5 is an illustrative diagram showing a cup transfer path pattern.

Figure 6 is a stop mechanism diagram of the moving stage.

Figure 7 is a chain key mechanism diagram of the moving stage in a product discharge port.

Figure 8 is a shutter mechanism diagram of a stage cover showing a different operation position.

#### Explanation of numerals

- |    |                                      |
|----|--------------------------------------|
| 1  | Cabinet of automatic vending machine |
| 2  | Product discharge port               |
| 3  | Stage cover                          |
| 4  | Cup                                  |
| 5  | Cup supplier                         |
| 6  | Raw material supplier                |
| 7  | Cold water for dilution              |
| 8  | Warm water supplier                  |
| 9  | Drink stirrer                        |
| 10 | Ice maker                            |
| 11 | Cup holder                           |
| 12 | Moving stage                         |
| 13 | Stage movement mechanism             |

- 15 Product discharge gate
- 16 Abscissa moving module
- 17 Ordinate moving module
- 45 Stop mechanism
- 49 Chain key mechanism of moving stage
- 55 Shutter mechanism

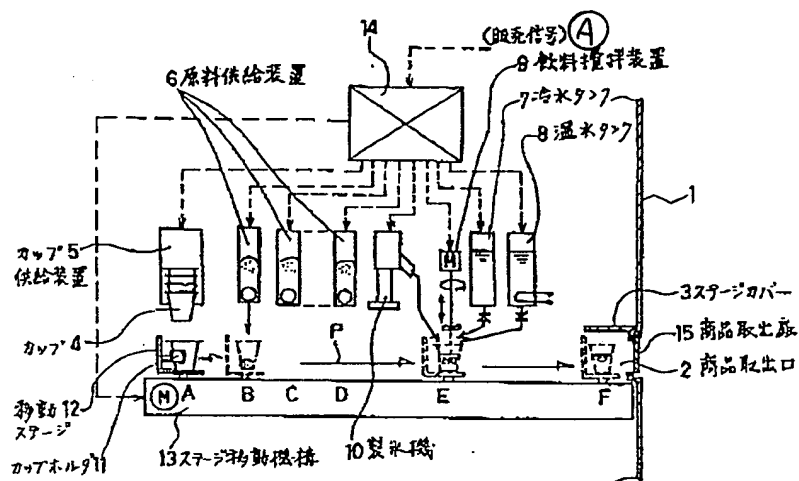


Figure 1

- Key:
- A Sales signal
  - 2 Product discharge port
  - 3 Stage cover
  - 4 Cup
  - 5 Cup supplier
  - 6 Raw material supplier
  - 7 Cold water tank
  - 8 Warm water tank
  - 9 Drink stirrer
  - 10 Ice maker
  - 11 Cup holder
  - 12 Moving stage
  - 13 Stage movement mechanism
  - 15 Product discharge gate

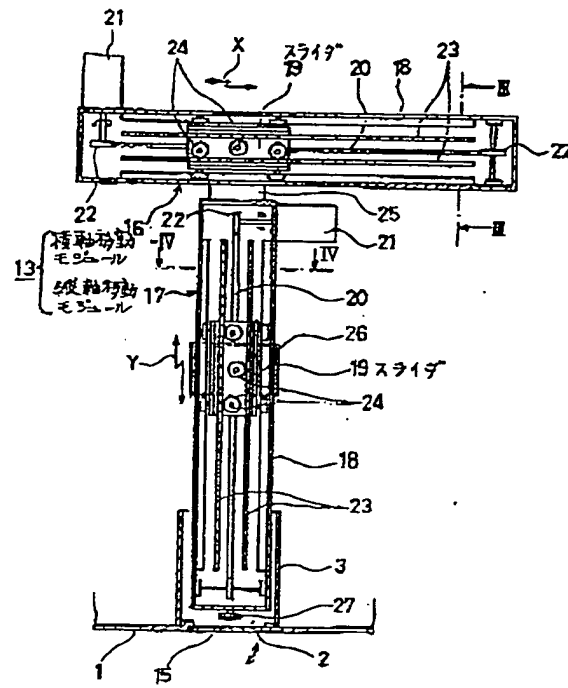


Figure 2

Key: 16     Abscissa moving module  
 17     Ordinate moving module  
 19     Slider

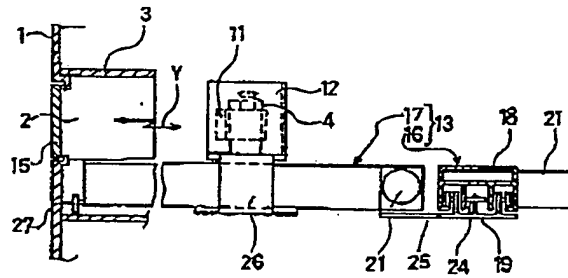


Figure 3

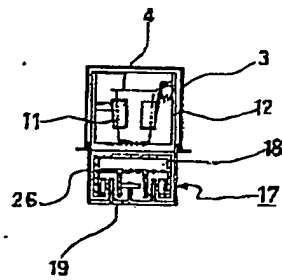


Figure 4



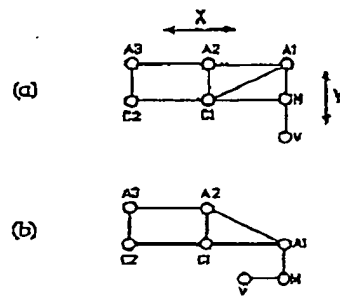


Figure 5

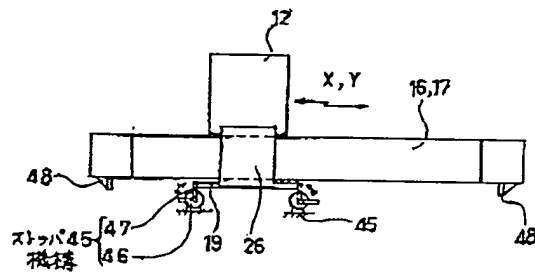


Figure 6

Key: 45      Stop mechanism

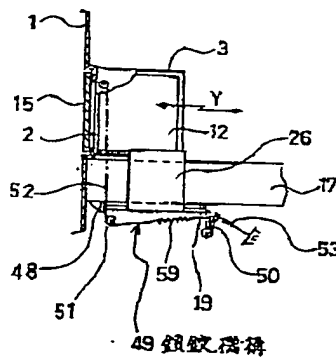


Figure 7

Key: 49 Chain key mechanism

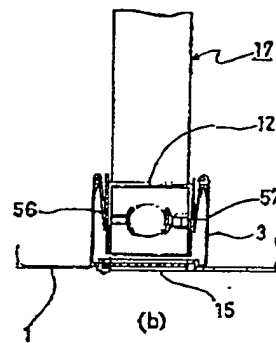
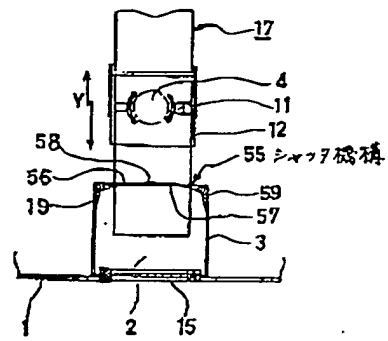


Figure 8

Key: 55 Shutter mechanism

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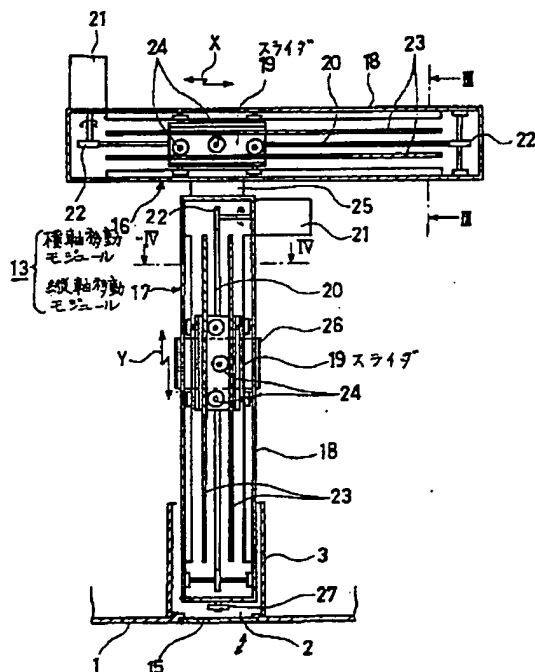
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(54) 【発明の名称】 カップ式飲料自動販売機

(57) 【要約】

【目的】 機内配備の各種機器の機内レイアウトの自由度を高めつつ、カップ供給装置から搬出されたカップを円滑に搬送して商品取出口へ送出することができるようにする。

【構成】 カップ供給装置から供給されたカップを受容保持する移動ステージを搬送経路に沿って移動するステージ移動機構13は、左右方向の固定スライドベースに沿ってスライダ19を移動操作する横軸移動モジュール16と、この横軸移動モジュール16の前方に位置しかつ前後方向の可動スライドベースの後端を横軸移動モジュール16のスライダ19に連結した縦軸移動モジュール17とから構成され、移動ステージは縦軸移動モジュール17のスライダ19に搭載される。



## 【特許請求の範囲】

【請求項1】 カップ供給装置から供給されたカップを受容保持するカップホルダー付き移動ステージと、この移動ステージを搬送経路に沿って移動するステージ移動機構と、前記移動ステージの搬送経路途中において前記カップ供給装置の後段に配置され各種原料を前記移動ステージのカップに供給可能である各種原料供給装置と、前記移動ステージの搬送経路途中において前記各種原料供給装置の後段に配置され希釈用水を前記移動ステージのカップに供給可能である希釈用水供給装置とを備え、前記ステージ移動機構を、左右方向の固定スライドベースに沿ってスライダを移動操作する横軸移動モジュールと、この横軸移動モジュールの前方に位置しかつ前後方向の可動スライドベースの後端を前記横軸移動モジュールのスライダに連結した縦軸移動モジュールとから構成し、前記移動ステージを前記縦軸移動モジュールのスライダに搭載したことを特徴とするカップ式飲料自動販売機。

【請求項2】 請求項1項記載の自動販売機において、移動ステージの移動経路上に指定された中間停止位置に選択的に動作する出入可能なストッパ機構が配備されていることを特徴とするカップ式飲料自動販売機。

【請求項3】 請求項1又は2項記載の自動販売機において、商品取出口は、客の手動操作で開放される商品取出口と、この商品取出口の開放操作に連動して商品取出口のところに搬送されて来た移動ステージをその位置に係止拘束する鎖錠機構とを備えていることを特徴とするカップ式飲料自動販売機。

【請求項4】 請求項1乃至3の1つに記載の自動販売機において、商品取出口は機内側に設置したステージカバーを備え、そのステージカバーに対して、常時は移動ステージ進入側の開口部を閉塞し、移動ステージの進入によって開放されるシャッタ機構を備えていることを特徴とするカップ式飲料自動販売機。

【請求項5】 請求項1乃至4の1つに記載の自動販売機において、販売飲料の種類別に機内に分散配備されたカップ供給装置、各種原料供給装置に対し、飲料選択に対応して移動ステージを各種カップ供給装置、原料供給装置のうちの指定された供給位置を経由して商品取出口に至る最短搬送経路に沿って移動制御することを特徴とするカップ式飲料自動販売機。

【請求項6】 請求項1乃至5の1つに記載の自動販売機において、横軸移動モジュール及び縦軸移動モジュールの各駆動モータに対して1基のドライバをリレーにより切換えて運転制御することを特徴とするカップ式飲料自動販売機。

## 【発明の詳細な説明】

## 【0001】

【産業上の利用分野】 本発明は、コーヒー、ココア、紅茶又はシロップ等の各種粉末、液体原料に湯、水、氷等

を加えて調合した飲料をカップに入れて販売に供するカップ式飲料自動販売機、特にそのカップ搬送系の構成に関する。

## 【0002】

【従来の技術】 従来におけるこの種のカップ式飲料自動販売機では、販売指令により原料と湯水とを機内のミキシングボール内に搬出し、ここで原料を攪拌して飲料を調合した後に、この飲料をミキシングボールから飲料ホースを通じてバンドステージに搬出されたカップ内に注入するような方式が採用されている。

【0003】 しかしながらかかる従来方式のカップ式飲料自動販売機では、飲料の攪拌、供給過程で、ミキシングボール及びこれに続く飲料ホースの内部には飲料の溶け残り滓が付着残留するために、販売待機時間が長くなると待機時間の経過とともに飲料滓に細菌が発生、繁殖し、これが次の飲料販売時の際に飲料に混入するという衛生上の問題が派生する。まり商品取出口の近傍に飲料ノズル等が配管露呈しているために飲料ノズルの汚染、異物投入等のいたずらを受けるおそれがある等安全管理面でも問題がある。

【0004】 かかる観点から前記した衛生、安全面上の問題点解決並びにこれに伴う洗浄作業の手間を省いてメンテナンス性を改善できるようにしたカップ式飲料自動販売機が同じ出願人から例えば特願昭61-12903号で提案されている。

【0005】 かかるカップ式飲料自動販売機は、機内に分散配備されたカップ供給装置、各種原料供給装置、希釈用水供給装置、飲料攪拌装置及び商品取出口に通じるバンドステージの間の経路に沿ってカップを巡回移送するカップ搬送装置を備え、販売指令によりカップ供給装置から搬出されたカップを受容保持した上で該カップを原料供給装置、希釈用水供給装置、飲料攪拌装置を経てバンドステージへ送出するとともに、このカップ搬送の途上でまずカップ内に指定された原料を投下供給し、続いて希釈用湯、水、氷の供給、および飲料攪拌操作を行って飲料を調合した後に、この飲料入りカップをバンドステージへ送出するようにしたものである。ここでカップ搬送装置は搬送巡回経路に沿って張架されたエンドレスベルト等の搬送帯と、この搬送帯の周上に支持してカップ供給装置から落下搬出されたカップを受容保持するカップホルダとで構成されている。

## 【0006】

【発明が解決しようとする課題】 ところで既提案の搬送帯による巡回搬送方式のカップ供給装置では次記のような問題がある。

【0007】 (1) カップ搬送過程でカップホルダに保持されているカップが機内の巡回搬送経路に沿って搬送帯のコーナー部を回る際に急加速、急減速を受け、この結果としてカップ内に収容されている液体飲料が慣性により溢れ出る虞がある。



ライドベース18、スライダ19、スライダ19に結合してスライドベース18内に張架した駆動搬送帯20、およびバルスモータ、可逆モータ等を採用した駆動モータ21より構成されている。なお、22は搬送帯を張架するスプロケット、23はスライダ19のガイドレール、24はガイドレール23に対向するスライダ19のガイドローラである。

【0016】ここで、横軸移動モジュール16はスライドベース18を左右の向きにして機内後方位置に固定配置されている。一方、縦軸移動モジュール17はそのスライドベース18を前後方向に向け配置した上で、かつその後端が横軸移動モジュール16に内蔵のスライダ19に連結結合されている。さらに、縦軸移動モジュール17の内蔵スライダ19には連結片26を介してスライドベース18の上面側に移動ステージ12が搭載支持されている。なお、27は縦軸移動モジュール17の先端に取付けた横行ローラである。これに対し移動ステージ12は、ベンドステージを兼用するものでその上面と前面を開放した管体構造の枠体として成り、その枠体の内部にカップ4を左右両側から挟持して定位置に受容保持するカップホルダ11が装備されている。またこの移動ステージ12に対向して商品取出口2に設置されたステージカバー3は移動ステージ12の外形寸法に対応してその上面および左右側面を覆うように構成されている。なお図示例でのステージカバー3は移動ステージ12の上面および左右両側面の3面を覆う構造であって下面側が開放されているが、連結片26の形状を変えて移動ステージ12を縦軸移動モジュール17の先端よりもさらに前方へ突出し移動できるようにして置けば、移動ステージ17との干渉なしにステージカバー3を上下、左右の4面を仕切る構造とすることができる。

【0017】かかる構成で横軸移動モジュール16と縦軸移動モジュール17を左右、前後の方向に操作することにより、移動ステージ12を矢印X、Yの直角座標系の上で任意な地点に移動することが可能となる。したがって機内に配備するカップ供給装置、各種原料供給装置、希釈用水供給装置、飲料攪拌装置等の配置は従来のベルト搬送方式のように制約を受けることなく比較的自由にレイアウトすることが可能となり、かつこれら各種装置の間でカップ供給装置から受容したカップを指定されたカップ搬送経路に沿って搬送し、この搬送過程でカップ内で飲料を調合した上で移動ステージ12とともに飲料入りカップ4を商品取出口2に臨むステージカバー3内に搬入することができる。なお販売動作時間に余裕があれば、前記した横軸移動モジュール16と縦軸移動モジュール17の駆動モータ21に対し、1基の駆動モータドライバをリレーの切換えにより交互に各移動モジュールを運転制御することも可能であり、これによりトータルコストの低減化が図れる。

【0018】しかもこのステージ移動機構13は直線移

動機構を組合せたので、従来のベルト巡回方式に見られるようなカップ搬送工程のコーナー部で加わる急加速、急減速及び振動等の不具合がなく、飲料入りカップをスムーズに商品取出口まで搬送することができる。また商品取出口のステージカバー3に対して移動ステージ12を後方から搬入することが可能であり、かつこの販売位置ではステージカバー3と移動ステージ12とで商品取出口2と機内との間が完全に遮断されるので商品取出口より機内に手を差し入れることが不可能となり機内機器に対するいたずらを確実に防止できるようになる。

【0019】ところで上記ステージ移動機構13については、図1で述べたように移動ステージ12をカップ供給、原料供給、希釈水、氷供給、飲料攪拌位置に対応してその移送経路上に指定された各地点A～Fで停止制御する必要がある。しかもこの場合に販売飲料の種類によってカップ種類及びカップ内に供給する原料の種類が異なることから、移動ステージの移送途上における中間停止位置も飲料の選択に対応してその都度指定されたカップ供給装置、原料供給装置の供給位置で停止するように変更する必要がある。

【0020】次に図5図(a)、(b)によりステージ移動機構に対応して定めたカップの搬送経路の具体的なパターン例を示す。図において、A1～A3は異種の原料供給装置、C1、C2と異種のカップ供給位置、Mは希釈用水、氷の供給及び飲料攪拌位置、Vは商品取出口の販売位置を示すものであり、各位置の間を結ぶ線がカップの搬送経路を示している。またここで図5(a)、(b)では各種供給位置がX-Y座標系内に分散配備されており、販売飲料の選択に応じて指定されたカップ、原料の供給を受けるようにカップの搬送経路が選択される。なおこの場合に各種販売飲料のうち最も販売頻度の高い種類の飲料に対応するカップ供給装置C1および原料供給位置A1を商品取出口から見て近い位置に設定し、C1地点からスタートしてC1-A1-M-Vに至る最短距離を経由してカップを搬送すれば販売時間が短縮して客の待ち時間を短くし、サービス性の向上を図ることができる。また(a)図と(b)図との相違は飲料攪拌位置Mと販売位置Vとが異なるもので、機内における各種機器のレイアウトとの関連で選択される。なお、カップ供給装置C1、C2と原料供給位置A1～A3の配列は図示例に限定されことなく変更可能である。

【0021】一方、カップ搬送経路に沿って移動ステージを移動するステージ移動機構の運転制御は、ステージ移動機構の駆動モータを運転制御部からの指令でプログラム制御し、指定された経路に沿って移動ステージを所定の地点で一時停止させることにより実施されるが、この場合に移動ステージ停止時の慣性力を抑えて所定の位置に正しく位置決めして停止させるには駆動モータのドライバ、位置検知センサの高性能化に加えて指定された停止位置で選択的に働く移動ステージの機械的なストッ

バ機構が必要となる。

【0022】次に販売飲料の種類に対応して移動ステージを所定の停止位置に停止させるストッパ機構についての実施例を図6に示す。図6は先に述べた直線移動モジュールを対象とした実施例であり、移動ステージ12の移送経路途中における指定されたカップ供給、原料供給位置等にはそれぞれ移動モジュールのスライダ19に対向して制御指令により動作位置と不動作位置との間で出入操作されるストッパ機構45が設置されている。このストッパ機構45はロータリソレノイド46に回転レバ

ー式のストッパ片47を取付けて成るものであり、常時はストッパ片47を点線で示す不動作位置に後退待機させて置き、動作信号が与えられるとソレノイド46の動作によりストッパ片47が突進位置に突出し、この位置に移動してきた移動ステージ12を位置決め停止させる。なおこのストッパ機構はロータリソレノイド方式に限られるものではなく、往復動式ソレノイドでもよく、かつその駆動方式は電気式の他に空気、油圧駆動も採用も可能である。またストッパ片47は例えばゴム等の弾性体で作り、移動ステージ12の移動慣性を緩衝吸収するようにするのがよい。またストッパ片に別なダンバ機構を備えることもできる。なお、図において48は移動モジュールのスライドベースの両端に設置した移動ステージ12の停止ストッパである。

【0023】また先述した飲料販売動作で移動ステージが商品取出口の販売位置に到達した状態では、商品取出口と機内との間がステージカバー及び移動ステージにより遮断されていたずらを防止できる旨を説明したが、この場合いたずら防止機能をより確実にするには、商品取出口に手を差し入れて移動ステージを押しても移動ステージが動かないようにその位置に拘束鎖錠して置くことが望ましく、次にこのための移動ステージ鎖錠機構の実施例を図7に示す。この図7は縦軸移動モジュール17とともに移動ステージ12が商品取出口へ移動して来るステージカバー3内に搬入されている販売位置の状態を示している。図において、49は鎖錠機構であり、該鎖錠機構49は移動モジュール17のスライダ19の後端に対向する鎖錠レバー50と、該鎖錠レバー50と商品取出口に装備した商品取出扉15との間にブリー51を経て引回し張架されたワイヤ52と、鎖錠レバー50を後退位置に付勢するばね53とから構成されている。なお、54は商品取出扉15を開位置に戻す復帰ばねである。

【0024】かかる構成により、移動ステージ12が飲料入りカップを乗せて商品取出口に到達し、ここで客が商品取出扉15を手動で開放すると、この扉開放動作に連動してワイヤ52が引っ張られ、鎖錠レバー50がスライダ19の後端に係止される。したがって移動ステージ12はその位置に拘束鎖錠されることになり、扉15の開放状態で仮に前方から移動ステージ12を押しても

移動ステージは動かず、これによりステージカバー3と共同して機内側へのいたずらをより確実に防止できる。なお上記した鎖錠機構は一例を示したものであり、例えば商品取出扉15の開放を電氣的に検知し、ソレノイド操作により鎖錠レバーを動作させるように構成することもできる。

【0025】図7は販売位置でのいたずら防止策を示したものであるが、次に図8(a)、(b)により販売位置以外での状態における商品取出口のいたずら防止構造の実施例を示す。即ち、この実施例では、商品取出口2に設置したステージカバー3の後端側には、常時は後端開口部を閉塞する観音開き式のシャッタ機構55を装備している。このシャッタ機構55はステージカバー3の後端部にヒンジ結合された左右2枚の扉板56、57と、扉板56と57が閉じた状態で後方に開くのを阻止するストッパ58と、扉板を常時閉じる方向に付勢するばね59とから成る。

【0026】かかる構成においては、移動ステージ12がステージカバー3内に搬入されていない状態では(a)図に示すようにシャッタ55が閉じており、従って商品取出扉15を開放しても機内側に手を差し入れることができない。一方、(b)図のように移動ステージ12が後方よりステージカバー3内に進入して販売位置に到達すると、移動ステージ12自身が前記シャッタ55を押し開く。また移動ステージ12が販売位置から後方へ後退移動すると、シャッタ55は再びばね付勢により閉じる。これにより販売待機状態等で商品取出口2から機内に手を差し入れるいたずらを確実に防止できる。なおシャッタに対して別な鎖錠機構を備え、移動ステージの搬入時にのみこれを検知して鎖錠を解くように構成することもできる。

【0027】

【発明の効果】以上述べたように、本発明は、カップ供給装置から供給されたカップを受容保持する移動ステージを搬送経路に沿って移動するステージ移動機構を、左右方向の固定スライドベースに沿ってスライダを移動操作する横軸移動モジュールと、この横軸移動モジュールの前方に位置しかつ前後方向の可動スライドベースの後端を前記横軸移動モジュールのスライダに連結した縦軸移動モジュールとから構成し、前記移動ステージを前記縦軸移動モジュールのスライダに搭載するように構成したことにより、横軸移動モジュールと縦軸移動モジュールとの組合せで直角座標形移動機構が容易に構成でき、これによりカップ供給装置、各種原料供給装置、希釈用水、氷供給装置、飲料攪拌装置等の各種機器に対する機内配置のレイアウトの制約をなくし、各種機器の設置位置をメンテナンス性を優先にして最適位置に設定することが可能となる。

【図面の簡単な説明】

【図1】本発明の一実施例の基本的な構成図

【図2】図1におけるステージ移動機構の具体的な構成を示す横断平面図

【図3】図2におけるⅠⅠⅠ-ⅠⅠⅠ断面図

【図4】図2におけるⅠⅤ-ⅠⅤ断面図

【図5】カップ搬送経路のパターンを表す説明図

【図6】移動ステージのストッパ機構図

【図7】商品取出口における移動ステージの鎖錠機構図

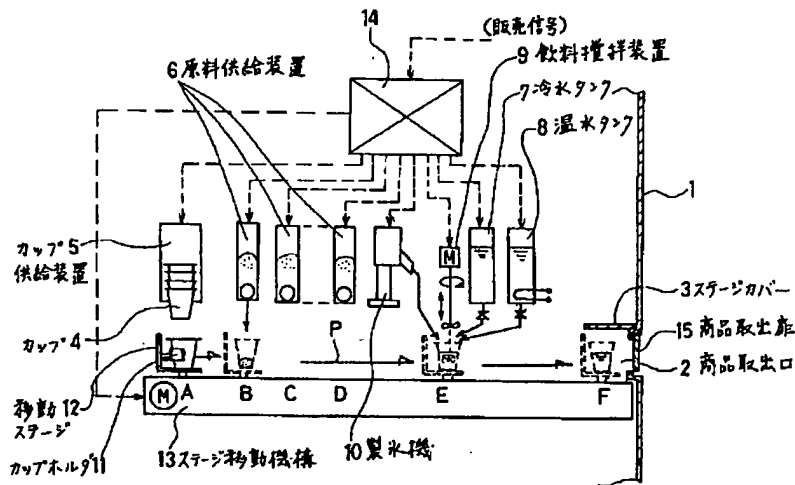
【図8】異なる動作位置を示すステージカバーのシャッタ機構図

【符号の説明】

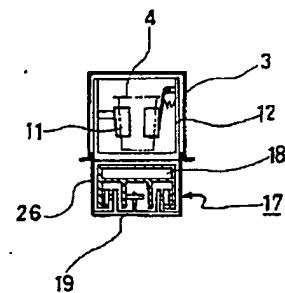
- 1 自動販売機のキャビネット
- 2 商品取出口
- 3 ステージカバー
- 4 カップ
- 5 カップ供給装置

- 6 原料供給装置
- 7 希釈用冷水
- 8 湯水供給装置
- 9 製氷機
- 10 飲料攪拌装置
- 11 カップホルダ
- 12 移動ステージ
- 13 ステージ移動機構
- 15 商品取出扉
- 16 横軸移動モジュール
- 17 縦軸移動モジュール
- 45 ストッパ機構
- 49 移動ステージの鎖錠機構
- 55 シャッタ機構

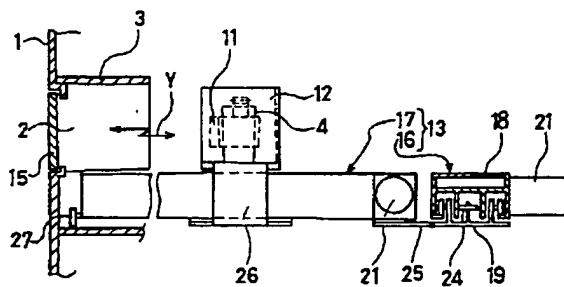
【図1】



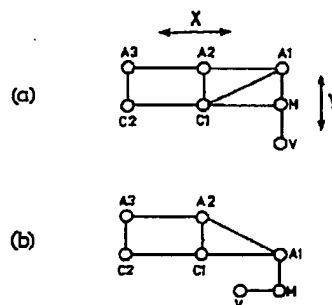
【図4】



【図3】

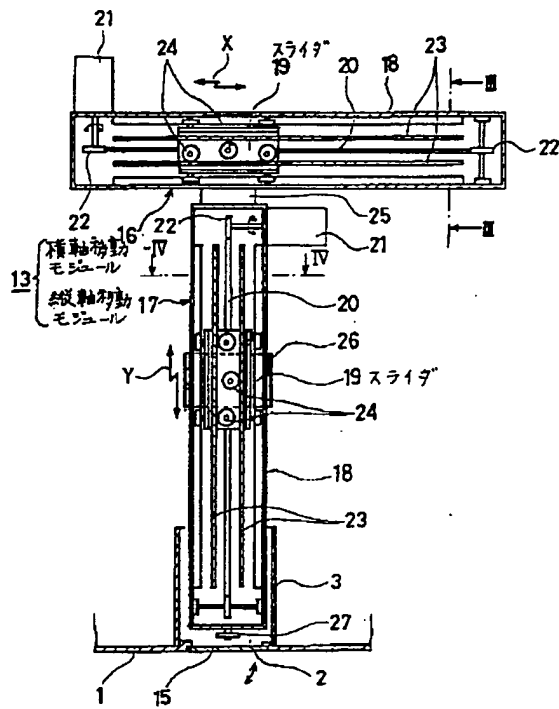


【図5】

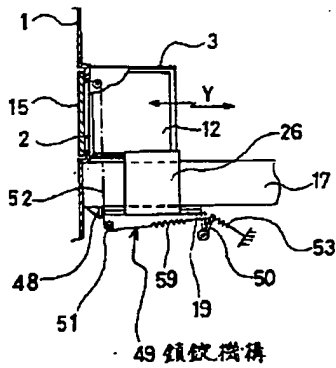




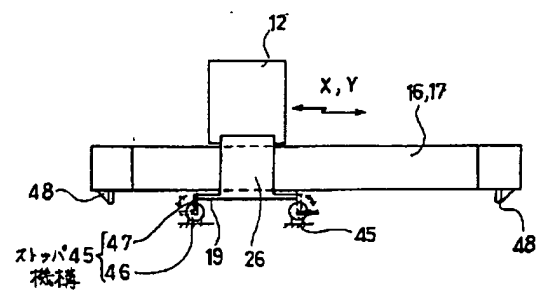
【図2】



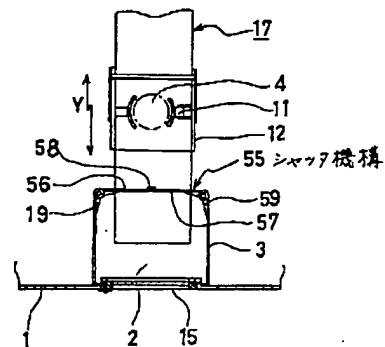
【図7】



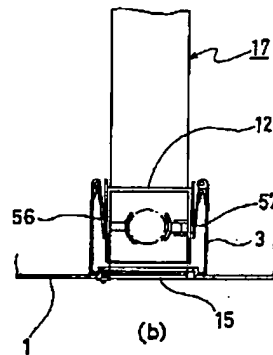
【図6】



【図8】



(a)



(b)